

ASRE Model-Observation Evaluation Tool

The ASRE Model-Observation Evaluation Tool developed within the NOAA ESRL Atmospheric Science for Renewable Energy Development (ASRE) group enables comparison between atmospheric model and measurement data. This web application should facilitate model development and instrument maintenance during field campaigns. To enable further analyses, the authors make these data used in analyses available in NetCDF format via the website FTP download links.

DATA DESCRIPTION

The FTP download links enable direct access to the measurement and model data used in the creation of the Model-Observation Evaluation plots. The data are provided in NetCDF format using the naming convention:

YYYYMMDD.SID.data_type.nc

YYYY denotes the year with century as a decimal number (e.g. 2019), MM denotes the month as a zero-padded decimal number (e.g. 01, 02, etc.), DD denotes the day of the month as a zero-padded decimal number (e.g. 01, 02, etc.), SID denotes the measurement site station ID, and data_type is a string denoting the requested data type. The full list of measurement site station IDs and data type strings are defined in the tables below.

Station Name/Location	Station ID (i.e. SID)
Central Facility, Lamont, OK	C1
Central Facility Extension, Lamont, OK	E13
Central Facility Extension, Lamont, OK	E14
Medford, OK	E32
Waukomis, OK	E37
Morrison, OK	E39
Peckham, OK	E41

Data Type	Data Type String (i.e. data_type)
Station Measurement Data	arm_meas
HRRR Version 3 Model Data	hrrr_v3
HRRR Version 4 Model Data	hrrr_v4
RAP Version 4 Model Data	rap_v4
RAP Version 5 Model Data	rap_v5

Please find in the sections below a detailed description of the available measurement and model data.

Measurement Data File Description (e.g. YYYYMMDD.SID.arm_meas.nc):

Available measurement data from the date and site selected are provided to the user in NetCDF format. In the comments section of the NetCDF file, a list of the ARM SGP datastreams (e.g. sgp915rwpwindavgC1.a1.20200407.000000.nc) that were used to construct the data file is provided. These datastreams can be directly accessed via the ARM Data Discovery Web Portal (<https://adc.arm.gov/discovery/#/>). A free ARM user account is required to access these data; information on how to register can be found here: <https://adc.arm.gov/armuserreg/#/new>.

The assigned measurement time is determined by combining the *base_time* (seconds since epoch [1 Jan 1970]) and *time_offset* (seconds since the *base_time*) variables. Measurement sampling frequency and averaging techniques differ between the various instrument types. Therefore, an instrument-specific prefix is appended to these time variables (i.e. *base_time* and *time_offset*) to inform the user of the corresponding instrument; the same instrument-specific prefix is also appended to the saved atmospheric variables. A description of these instrument-specific prefixes and the instruments they represent are provided below. Although the evaluation plots can show data from multiple dates (i.e. to conform with the various model initialization times and forecast lengths), the downloaded data file will only include data from the requested date.

Variable Prefix	Instrument Type
sfc_met_	Surface Meteorological Data
rwp_	Radar Wind Profiler
dl_	Profiling Doppler Lidar
sfc_rad	Surface Radiation Data
ecor_	Eddy Correlation Flux Measurement System
baebbr_	Best-Estimate Fluxes from EBBR Measurements and Bulk Aerodynamic Calculations
tow_winds_	60-m Tower Wind Data
tow_met_	60-m Tower Meteorological (i.e. Non-Wind) Data

Datastreams on the ARM Data Discovery Web Portal are used to create the available data files. Because individual datastreams are uploaded to the web portal at different lag times (e.g. one day behind real time, two days behind real time, etc.), the data files are modified daily pending the availability of new data. However, after 90 days it is assumed that all relevant data have been uploaded to the web portal, and therefore, the data made available via FTP are no longer modified.

Model Data File Description (i.e. YYYYMMDD.SID.mdl_name.nc):

Available model data from the date and site selected are provided to the user in NetCDF format. The HRRR Version 3 model data can be accessed using the data file suffix *hrrr_v3.nc*, the HRRR Version 4 model data can be accessed using the data file suffix *hrrr_v4.nc*, the RAP Version 4 model data can be accessed using the data file suffix *rap_v4.nc*, and the RAP Version 5 model data can be accessed using the data file suffix *rap_v5.nc*. The model data for each ARM SGP measurement facility are extracted by Dave Turner (dave.turner@noaa.gov). Model data for the previous month are typically extracted on the first day of the month (i.e. model data for June are extracted on 1 July), which means the model data are generally available at a one-month lag time

(but longer lag times can occur). Bilinear interpolation is used to extract the model data to the ARM SGP measurement site.

Model dimensions (i.e. forecast duration and height) are defined in the NetCDF file. The HRRR Versions 3 and 4 model data extends out 18 hours from the model initialization time, while the RAP Versions 4 and 5 data extends out 21 hours from the model initialization time. Furthermore, each model has four initialization times when the forecast duration exceeds the standard forecast length. At 00, 06, 12, and 18 UTC, the HRRR Version 4 forecast extends out 48 hours from the model initialization time, while the HRRR Version 3 forecast extends out 36 hours from the model initialization time. Alternatively, at 03, 09, 15, and 21 UTC, the RAP Version 5 forecast extends out 51 hours from the model initialization time, while the RAP Version 4 forecast extends out 39 hours from the model initialization time. However, model data are not always available at each forecast hour because of network interruptions that can occur during model extraction. Unlike with measurement data, once the model data have been extracted and made available via the FTP link, there are no subsequent modifications made to the data files.

The table below defines the model variables provided in each NetCDF file. Appended to each model variable is a string denoting the model initialization time. For example, *p1_ini00* denotes the model forecast for pressure at the 00 UTC initialization time.

Variable Prefix	Atmospheric Variable
height_	Forecast Height
forecast_	Forecast Hour
p1_	Pressure
psfc1_	Surface Pressure
t1_	Temperature
tsfc1_	Surface Temperature
rhsfc1_	Surface Relative Humidity
r1_	Water Vapor Mixing Ratio
rsfc1_	Surface (2-m) Water Vapor Mixing Ratio
wspd1_	Wind Speed
u1_	U-Component of Wind
v1_	V-Component of Wind
w1_	W-Component of Wind
usfc1_	U-Component of Wind at 10 m
vsfc1_	V-Component of Wind at 10 m
u80m1_	U-Component of Wind at 80 m
v80m1_	V-Component of Wind at 80 m
lflux1_	Latent Heat Flux
sflux1_	Sensible Heat Flux
ustar1_	Friction Velocity
dswsfc1_	Downwelling Short Wave Flux at the Surface
uswsfc1_	Upwelling Short Wave Flux at the Surface
dlwsfc1_	Downwelling Long Wave Flux at the Surface
ulwsfc1_	Upwelling Long Wave flux at the Surface

dswdbeam1_	Direct Shortwave Down
dswdiffuse1_	Diffuse Shortwave Down
tv1_	Virtual Temperature
lwc1_	Liquid Water Mixing Ratio

Contacts

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